

Inside the

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it's not rocket science

Do you know Beans about Java?

Ever since Java's public introduction in late 1995, the language has enjoyed enormous success in the Web development community. Almost overnight, Java has become the de facto development standard for the Internet.

A number of factors contribute to Java's success. First, it's an object-oriented programming language, but in a simpler sense than C++. In addition, Java generates extremely small executables (class files), so your programs download quickly over a slow connection. However, probably the most compelling feature of Java is that it lets you run the same executable in any operating system that supports Java—and without recompiling.

Growing the Beans

With all that's going for Java, you're probably wondering if improvements can be made in a language that seems to have all the answers. You bet. Java clearly has a lot of potential in terms of the Internet. However, in its initial iteration, it lacked a component model, making it less than ideal as a corporate development tool.

Realizing this limitation, JavaSoft recently announced JavaBeans, which is Java's answer to model component software. JavaBeans allows you to reuse Java components and thus quickly add more functionality to your existing applications. And in a world in which an Internet application's life cycle has been reduced to about 90 days, this added speed and efficiency are crucial. Best of all, if you're familiar with the

Java class structure, you're well on your way to understanding JavaBeans. In this article, we'll explain the technology behind JavaBeans and how it fits into the component model.

What's a component?

Component technology is a very popular and powerful concept that is used throughout the software industry to increase development efficiency. If you're familiar with an object-oriented programming language such as C++, you probably know about and use the component model. In a nutshell, a component is software that's designed for reuse. For example, a door handle is designed in such a way that it fits into many different doors. If you change your door, you don't necessarily have to change the door handle—you can reuse it on the new door.

In the same way, when you build a component, you can make sure that it can be accessed and used in a variety of different development and runtime environments. Now that we've developed a basic definition of component technology, let's dig deeper and find out how it works.

Component models

At the heart of every software component technology is a component model. A *component model* defines the architecture of each individual component and determines how you can manipulate and use each of them. It also defines how the component will interact externally and in a dynamic environment. It's

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critical for a developer to understand the component model and architecture for a given development platform.

The software component model has two main elements: components and containers. The *component* part defines how individual components are created and used. The *container* part defines how to combine and arrange components to interact together. For example, if you build a door handle and locks for a door, you can say these are individual components and the door itself is a container. And, as you may have guessed, a container can also be a component.

The JavaBeans component model is based on the Java environment. You can still build a reusable component in Java without JavaBeans—but not without some compromises. At the object level, there's no simpler way to add interoperability between Java classes. JavaBeans answers the component challenge well by providing a rich set of mechanisms that define the interaction between objects. Let's explore some features.

It's all in the Beans

Java's strength and popularity come from its simplicity and ease of use. JavaSoft, the creators of JavaBeans, designed the Beans technology with similar goals in mind. For instance, a JavaBeans application

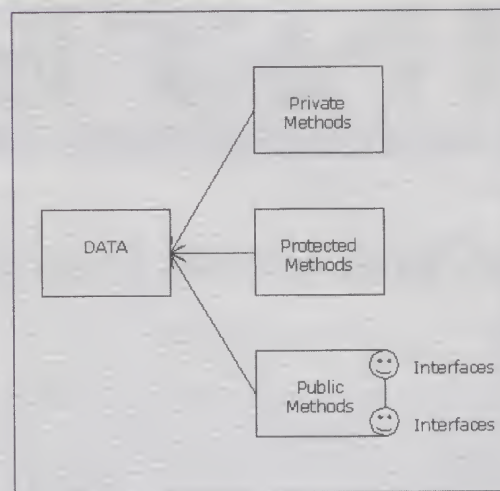
- is simple and compact
- is portable
- fully complements Java
- supports flexible design-time components
- supports distributed computing

Now let's examine these qualities in detail and see how JavaBeans stacks up.

It's simple and compact. Since JavaBeans is based on Java, it uses a class structure similar to the one that Java uses. Java classes are very small, so, as you might have guessed, JavaBeans components are small as well—yet without compromising functionality.

It's portable. Again drawing from Java, JavaBeans is platform independent. Just like with Java, you won't have to recompile a JavaBean (JavaSoft's lingo for a JavaBeans component) to run it on a different operating

Figure A



This figure represents a graphical view of the internal workings of a JavaBean.

system. You also won't have to worry about platform-specific class libraries, since JavaBeans will run on any platform that runs Java Virtual Machine.

It fully complements Java. Besides platform independence, one of the great features of Java is its built-in class discovery system. In Java, objects can interact with each other dynamically at runtime. This property creates a system in which you can integrate objects independently of their origins. JavaBeans exploits this Java feature fully—and without re-engineering it. JavaBeans also inherits persistence from Java. *Persistence* is the ability of an object to store and retrieve its internal state. JavaBeans handles persistence automatically.

It supports flexible design-time components. JavaBeans architecture has built-in support for specifying design-time properties. It also lets you edit the components visually. So in the end, you can build your application using a visual development tool (such as Java Workshop) to create or modify a JavaBeans component, much like you can modify an ActiveX Control in Visual Basic for Windows.

It supports distributed computing. As the Internet grows at an explosive rate, distributed computing is becoming a major trend in the development industry. JavaBeans implements the distributed-computing concept based on need, using Remote Method Invocation (RMI). As a developer, you're able to use

the distributed-computing mechanism wherever you need to, but it doesn't offer a built-in solution; as a result, the components can stay small. Besides RMI, you can take advantage of CORBA or DCOM.

So far, we've discussed the component object model and how JavaBeans fits the bill. Now let's take a closer look at a JavaBean.

What's in the Bean?

A JavaBean, like any object in the object-oriented programming world, consists of two major parts, *data* and *method*. The data part defines the state of the Bean. The method part defines how the state can be modified to suit your need. You can use Private, Public, and Protected methods. As the names imply, a Private class may be accessed only by the internals of the Bean, a Public class can be accessed by any component, and the Protected class can be accessed both internally and by derived Beans.

You can group a Bean's Public methods according to the functionality they provide. These groups of Public methods are called *interfaces*, and it's these interfaces that let you access a Bean's functionality. Refer to **Figure A** for a graphical view of a JavaBean.

As a developer, you'll only need to know a Bean's interface, so your application can manipulate and interact with the Bean. To wrap up, remember that no matter how complex a Bean may look from the outside,

it's really composed of data—and the methods that act on this data.

Other resources

There are lots of JavaBean resources available on the Internet. We've listed some of the best Web sites and other resources below.

The Only Component Architecture for Java
<http://splash.javasoft.com/beans/>

IBM's JavaBeans site
<http://www.software.ibm.com/ad/javabeans/>

Java Woman link station
<http://www.taxon.demon.nl/JW/jwbeans.html>

The Coffee Grinder
<http://trevorharmon.com/coffeegrinder/>

Java Beans shareware
<http://www.javashareware.com/jbeans.html>

Newsgroup
<comp.lang.java.beans>

<comp.lang.java.beans> FAQ
<http://lupo.on.ca/beans/JBFAQ.html>

Web Developer's Guide to Java Beans - a book by Jala Fegghi
<http://www.coriolis.com/site/msie/books/ind/wdgib.htm> *

Internet plus voice on one line

CAIS Internet, a first-tier Internet service provider (ISP), has solved a major problem in the Internet-access community. Using standard twisted pair (your regular home phone line), CAIS is able to provide both voice service and a 24-hour connection to the Internet for just \$40 a month.

Better than dial-up service

Forget ISDN and cable modems—this real-time Ethernet-based service, OverVoice, sends data at 1.54 megabits per second, up to 10

Mbps. That's roughly 300 times faster than your standard dial-up ISP. And you can talk to someone on the phone at the same time.

"OverVoice technology is fast, it's easy, and it's inexpensive to install. It uses the existing telephone wiring in a building, lets you talk on the phone while surfing the Web, and provides continuous high-speed access to the Internet without having to dial-in—that means you'll know when you get E-mail as quickly as you know when your phone rings," says CAIS Internet and CGX Communications President Ulysses Auger, II. "The phone became a utility of mass appeal and

mass use because it was always on 24 hours a day. OverVoice allows the Internet to always be on for consumers, maximizing the potential of the Internet."

"This new technology converts telephone wires from a hostile, limited medium into a friendly, expansive one," says OverVoice inventor David D. Goodman, a Washington-area engineer who has made a career out of developing innovative ways to use the world's established base of internal telephone wiring. "The technology is superior to ADSL, ISDN, and cable modems for multi-dwelling units. It is significantly cheaper to deploy, as fast or faster, and doesn't require your cable or local telephone company."

Instead, all the OverVoice service requires is that you install an Ethernet card, a device available from your local computer store for around \$40. Initially, CAIS is aiming for the multi-dwelling market, apartment buildings, condominiums, and so on. These dwellings are easier to equip, since the service requires an Ethernet "hub" for every 12 units. This is very much like the environment you find in many office complexes running an Ethernet Local Area Network (LAN).

OverVoice uses a high-speed dedicated line between a multi-dwelling unit building and the ISP. The Ethernet hub's location is on-site, and the high-speed line is connected to it and then routed to a proprietary device called the OverVoice Aggregator. This device allows for the aggregation of Internet traffic to occur on the premises, as opposed to occurring at the local telephone-switching center. Next, a special OverVoice Wall Jack, which has separate openings for phone and data connections, replaces the original phone jack. With this in place, OverVoice customers get a high-speed dedicated service without each individual having to get a special line from the phone company.

Overview

The OverVoice system makes it possible to have two-way interactive high-speed data at speeds ranging from 1.54 to 10 Mbps. The system has two proprietary elements that enable standard Ethernet technology and voice telephony integration. You can upgrade the system to accommodate transmis-

sion of laser-disk quality video and even higher data rates.

System components

The OverVoice system has two different components: the OverVoice Aggregation Box and the OverVoice Demultiplex Jack. You also need a standard telephone line installed in your home.

OverVoice Aggregation Box

The Aggregation Box provides the multiplexing necessary to add the Internet and PC data signals to the voice signal so that they can travel over the same wire. It also includes special filters to prevent data from flowing towards the telephone company's central office and voice traffic from flowing to the Internet.

The Aggregation Box's design conveniently connects a 10BaseT Ethernet hub used for computer LANs and the "punch-down" blocks commonly used in the telephone-wiring closets found in apartments, office buildings, hotels, and similar structures. Installation is quick because the Aggregation Box connects to both the telephone blocks and the Ethernet hub via 24-pair cables. Each cable supports up to 12 users.

OverVoice Wall Jacks

The OverVoice Wall Jacks replace existing jacks. They include one opening for connecting telephones in the normal manner and a second opening for connecting your PC. These jacks include electronic filters that separate the two signals. The jacks also include various electronic circuits that eliminate the negative effects on Internet traffic caused by the wiring splits, connectors, bundling, and telephone devices common to apartment buildings and other similar structures.

Wait for it

For now, the service is available only in the Washington, D.C., area—specifically the Arlington Courthouse Apartments and the Washington Marriott hotel in downtown Washington. These are test areas that CAIS is using for six months before it rolls out OverVoice to the rest of the country, which it plans to do next August at a service price of roughly \$40 per unit. *

Getting help with backups

Back up, back up, back up. Back up your hard drive often. If you've heard it once, you've heard it a thousand times, probably to the point where it has almost become meaningless. It's easy to become lazy about making backups if you haven't had any problems in a while. But still, it remains one of the best single pieces of computer advice you'll ever hear. In this article, we'll look at two services that can help make life easier if you have trouble maintaining your backups.

netTape

SafeGuard Interactive's netTape program is a Windows 95/NT application that offers remote backups of your entire system. SafeGuard's netTape page, shown in **Figure A**, is located at

<http://www.sgii.com/ng2>

Once you've created your account, the netTape software allows you to connect to SafeGuard's system and upload compressed, encrypted copies of whatever files you want to back up. You create your own encryption key, and SafeGuard doesn't record it. Further, SafeGuard allows only the originating computer to retrieve files, so the data is accessible only to you. If your computer has some sort

of accident that causes a total loss, you can order a copy of your files on CD-ROM for an extra fee.

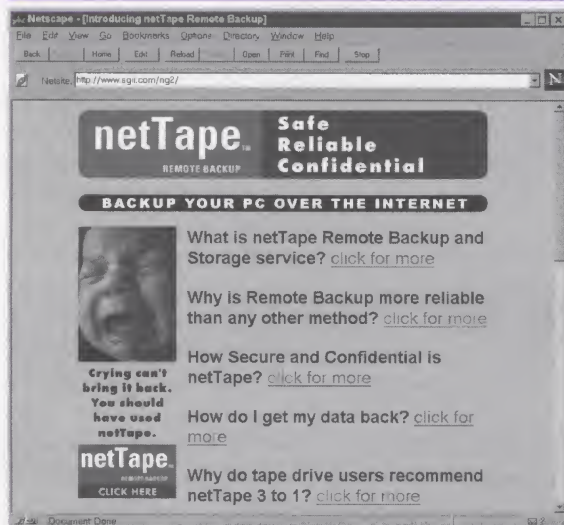
Your netTape software will perform unattended backups on a regular basis, according to the schedule you set up. You'll probably want to back up your entire system initially. Doing so may take several hours, depending on the volume and type of data you have. Thereafter, back up just new files and files that have changed. These maintenance backups normally take no more than ten minutes on a 28.8 Kbps modem.

As **Figure B** shows, netTape's design is similar to that of Explorer in Windows 95. To create or modify a profile (your selection of files to back up), simply select the files from the list.

After you've set up everything, the software automatically dials in and initiates backup sessions according to the schedule you've created. You don't have to remember to do anything except leave the computer running. In a business environment with several employees using their own computers, this feature can be especially important because some people may not remember to perform backups.

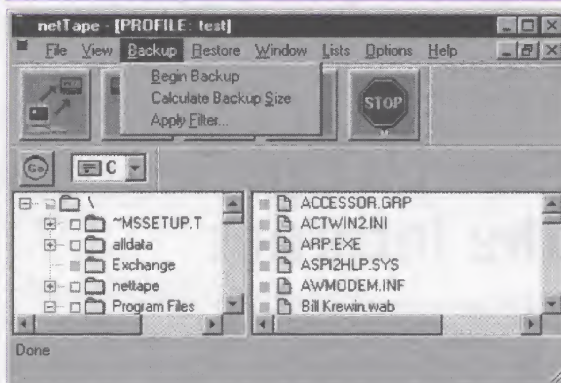
The advantages of offsite storage make netTape worth considering even if you have no trouble maintaining your own backups. Storing your data in a remote location adds an extra degree of safety against such things as inclement weather, theft, and hardware problems. It also eliminates the need to deal

Figure A



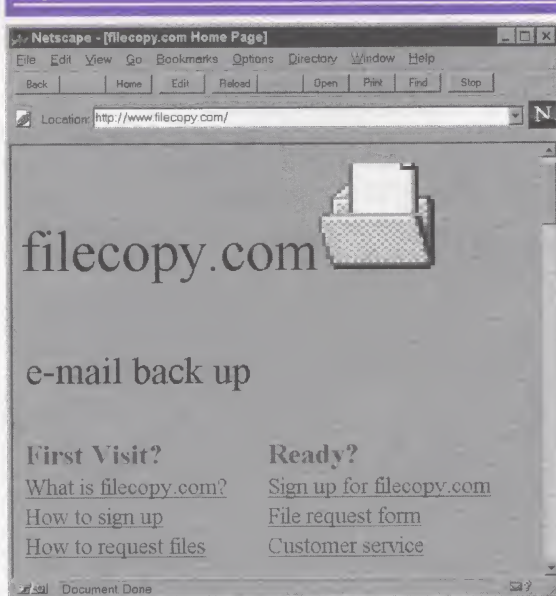
SafeGuard's netTape allows you to set up remote backups of your system.

Figure B



netTape lets you select files to back up from a screen similar to that of Explorer in Windows 95.

Figure C



Filecopy offers a backup service for E-mail.

with physical media; you know you won't lose the backups or run short of disks or tapes. SafeGuard's system is also easier to use than disks or tapes.

SafeGuard's netTape FAQ (frequently asked questions) describes elaborate precautions to safeguard your data. Among other things, SafeGuard maintains 24-hour manned security and interior and exterior video surveillance on its building. SafeGuard stores second copies of clients' data in a temperature and humidity controlled vault, and its system includes a 72-hour battery backup. Restoring files is also easy. Simply select the files you need from the list, and netTape will retrieve them for you.

SafeGuard charges \$119 a year for netTape service. This is a flat fee without any limits to the number or frequency of backups and

retrievals. Only the capacity of your hard drive limits the amount of data you can store. If you have more than one computer, you must have a separate account for each.

Filecopy

Filecopy is another backup service, but with a unique specialty. Filecopy will archive your outgoing E-mail and replace any messages you may lose. You can find Filecopy, shown in **Figure C**, at

<http://www.filecopy.com>

The service is \$145 per year for unlimited backups. After you've established your Filecopy account, simply include Filecopy's address in the cc: or bcc: header of your outgoing messages. Doing so sends a copy of each message to Filecopy. Using cc: will show Filecopy's address in the header, so the recipient will know the message is also going to Filecopy. Using bcc: will hide Filecopy's address. Many popular E-mail programs allow you to insert addresses in these header lines as a default, so sending copies to Filecopy will be automatic.

If you need to retrieve a message, return to Filecopy's home page and request it. Filecopy charges \$15 per request to E-mail the message back to you, or \$40 plus shipping to send you a hard copy. Filecopy date-stamps hard copies to show the time and routing information of the original message; you can use this data to confirm that you sent a message at a certain time. A single request can include several messages, and the company tries to get all requests filled within 24 hours.

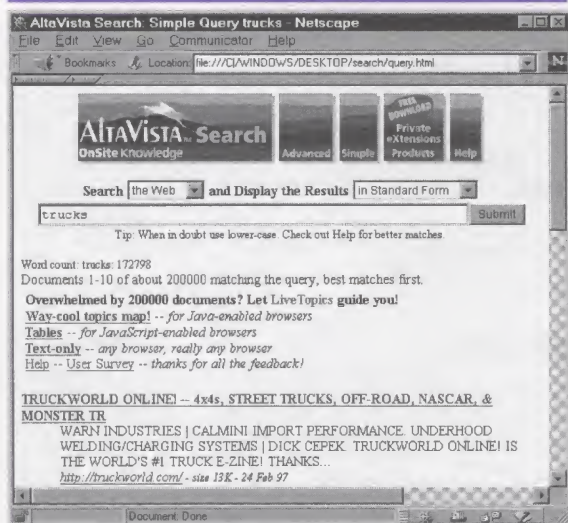
For security, Filecopy stores the E-mail offline. It returns E-mail only to your own E-mail address or to the postal address associated with your credit card account. *

Search tip: Searching for images on the Internet

There are probably as many JPEG, GIF, and other images on the Internet as there are Web pages. And if you're after a particular image, finding it can be just as hard as searching for a particular Web page. Know-

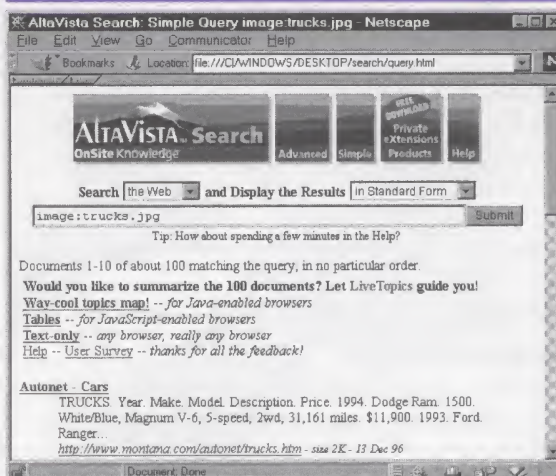
ing how and where to search can make the difference between getting a hundred thousand relatively useless results and a hundred very useful results. Here are a few search tips that can help you track down images on the Internet.

Figure A



Searching for simple words on AltaVista can result in hundreds of thousands of query matches.

Figure B



AltaVista's image: keyword can help you limit query matches to a manageable number.

AltaVista Search's image: keyword

AltaVista provides a constraining keyword that instructs the search engine to look for your query in particular HTML tags, rather than the entire page. The image: keyword lets you query words in the HTML image tag. The format for a search using the image: keyword is *image:* plus the query word and the image extension type. Let's look at an example. A query for JPG images of trucks would look like this:

image:trucks.jpg

The image: keyword lets you search for images commonly found on the Internet, such as GIF, JPG, and MPEG images, as well as a variety of other image file formats including BMP, PDF, CLP, IFF, EPS, PCX, PNG, PSD, PXR, RAS, TGA, TIF, UFP, UPI, and WFM. Let's look at an example of how the image: keyword can help you manage your searches.

When you search for the word *trucks* on AltaVista, you'll get in excess of 200,000 matches to the query, as shown in **Figure A**. But when you use the image: keyword and restrict the search to JPG file formats, you'll only get about 100 matches, as shown in **Figure B**.

AltaVista also lets you search for images without including a file format, like this:

image:trucks

You can also combine keywords with other search parameters. For example, you could combine a keyword search for Acrobat PDF files with the word *Adobe*, as follows:

+image:example.pdf+adobe

Yahoo!'s Pictures category

Yahoo! has a section specifically devoted to Internet and computer images. The section includes links to image-oriented Web pages and other Yahoo! categories covering subjects like archive pages, clip art collections, icons, resources, and USENET groups. You'll find Yahoo!'s Pictures category at

http://www.yahoo.com/Computers_and_Internet/Multimedia/Pictures/

Lycos' Pictures & Sounds page

Lycos has a special search engine that lets you search for only image or sound files. This search engine lets you select radio buttons to search for graphic files, like GIF and JPG im-

ages, or for audio files, such as WAV, AU, and SND files. You can also access the Pictures and Sounds search engine via the Search dropdown box on Lycos' main page. Unfortunately, this Lycos feature doesn't let you search for specific file types, such as JPEGs only. The Lycos Pictures & Sounds page is located at

<http://www.lycos.com/lycosmedia.html>

Image databases and search engines

The Internet also hosts a handful of specialized search engines and databases that can help you find images on the Internet. We've listed some of the better ones below.

Interpix Image Surfer (and Yahoo! mirror)
<http://isurf.interpix.com>
<http://ipix.yahoo.com/>

The Icon Browser—114 pages of icons
<http://www.cli.di.unipi.it/iconbrowser/icons.html>

Virtual Image Archive
<http://imagiware.com/via>

Surf Madison Public File Libraries
<http://www.surfmadison.com/libsearch.htm>

WWW Images Server
<http://www.labj.com/images/>

Images, Icons, and Sounds
<http://members.aol.com/htmlguru/images.html>

Newsgroups

Phonetics International recently launched a new product called The Image Factory of New York (TIFNY), a USENET news reader specifically for viewing pictures. We mention it here because TIFNY lets you set up automated searches for new pictures in specific newsgroups. TIFNY is a fully functional shareware application for Windows 95 and NT systems, and you can download the program from

<http://www.pinck.com> *

Preparing a GIF for the Internet with Photoshop

There are several options to consider when you save a GIF image for the Internet. You can choose to decrease the amount of color, select a new color palette, interlace the GIF, or change colors in the image to transparent. In this article, we'll demonstrate how to use Photoshop to create a transparent background and interlace a GIF.

Gif89a

Included in Photoshop is the GIF89a filter. This filter lets you select and turn colors to transparent and interlace GIF images. To demonstrate how to export a GIF using the GIF89a filter, first open an image. For our example, let's use the RGB image shown in **Figure A**. (The GIF89a filter works only on RGB and Index Color images.)

Next, select the part of the image you want to show in the Web browser and move the selection to a new layer. To do so, use the

Figure A



We'll use this image to demonstrate how to make a background transparent.

Figure B



Use the Selection tools to select the portion of the image you want to export.

Selection tools to select only the giraffes, as shown in **Figure B**.

Then, cut the selection from the background layer and paste it into a new layer. To do so, choose Layer Via Cut from the New menu under the Layer menu. As you can see in **Figure C**, Photoshop places the selection on a new layer.

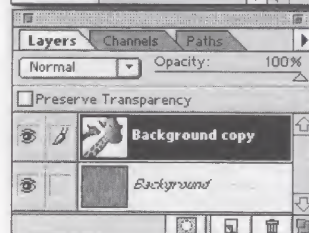
Now, to export only the giraffes, hide the background layer. To do so, select the Eye icon next to the background layer in the Layers palette.

Next, export the image. To do so, choose GIF89a Export... from the Export menu under the File menu. As you can see in the GIF89a Export dialog box shown in **Figure D**, Photoshop automatically sets the transparency index color to the standard Web browser gray. However, you can change the color by clicking the gray color swatch and choosing a new color from the Color Picker dialog box.

In addition to changing the transparency index color, you can alter the colors in your image. The GIF89a Export dialog box lets you change the color palette, load a new palette, or change the number of colors used in the image. For our example, choose the Adaptive palette and type 255 in the Colors text box.

Next, turn on the Interlaced check box to interlace the exporting GIF image. With most image formats, the computer reads the information and draws the image from top to bottom and from left to right. This translates

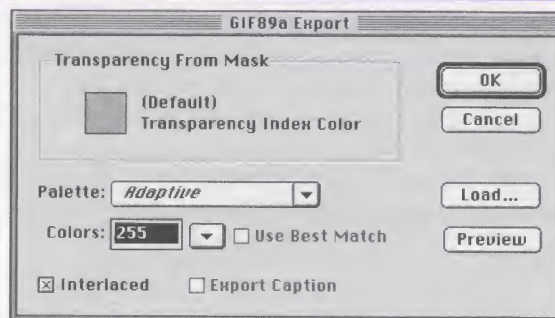
Figure C



Cut the selection and place it on a new layer.

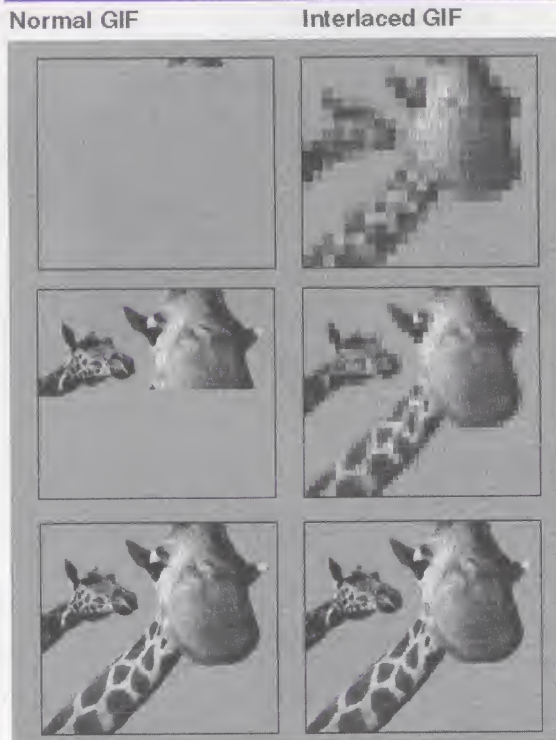
into a boring few moments while a user waits to see the image appear. Interlacing formats an image so that the computer will draw the entire image immediately, but at a low resolution. In the next few moments, as the download completes, the computer draws the rest of the image. **Figure E** on page 10 shows a visual comparison of a normal GIF and an interlaced GIF. Click OK to continue the export process.

Figure D



The GIF89a Export dialog box lets you alter colors and interlace your image.

Figure E



Interlaced images (those in the right column) immediately show the entire image, while the normal GIF format (in the left column) gradually draws the image from top to bottom and left to right.

Finally, name and save your file. Since you're creating images for the Web, it's preferable to use the standard PC naming convention to name your image (eight or fewer letters, a period, and a three-letter extension, such as 012Web.GIF). To name and save your file, click OK in the GIF89a Export dialog box. In the Save dialog box, enter a name for your GIF and click Save. **Figure F** shows the image viewed through a Web browser. *

Figure F



Using the GIF89a filter, you can make an image's background transparent.

E-mail on the go

New technologies for wireless communication are being minted almost daily, and quite frankly, it's difficult to keep up with what's what. Cellular fax modems, CDMA digital phones, and alphanumeric pagers all provide wireless gateways to the Internet. There are still only two major players providing wireless Internet radio services: Wynd Corp. and RadioMail. In this article, we'll look at Wynd's formidable list of services when combined with a PDA (Personal Digital Assistant) and a U.S. Robotics AllPoints wireless modem.

We chose Newton MessagePad 2000 as our PDA, though the AllPoints modem works equally well with Windows CE devices, Windows and Macintosh laptops, or any device with a Type II PCMCIA slot. Installation of the AllPoints modem is simple; just slide it into your PCMCIA slot, install the proper software, and voila—you're mobile.

Wynd is the carrier service, and it provides solutions for sending, receiving, and forwarding E-mail. It can even send E-mail to a telephone through the use of an innovative text-to-speech technology that allows you to send messages to anyone with a phone number.

Radio packets

Wynd uses a technology referred to as "radio packets." These data packets are similar to the packets used every day across both LANs and Intranets as well as the Internet itself. The only difference is they don't travel down phone lines. Instead, the signals are beamed in much the same way packets are sent to your everyday pager. Once received, the Wynd software converts these packets into text.

RF (Radio Frequency) technology has been around since before World War II. The first commercial wireless devices were sold in

England by the Marconi Wireless Company. Radio has played a very important part in the development of most media and communication, though most people don't realize that, like the Internet, most research and development in wireless broadcasting came about as a direct answer to many of the questions posed by that most disturbing of human pursuits, the art of war.

Personal communication systems

Today it appears that CDMA or PCS phones will be the solution for many people's wireless needs. A CDMA phone works in much the same way as a cellular phone, only it uses a digital signal as opposed to analog, resulting in the ability to send data and voice with a clearer signal over your standard cell phone. However, CDMA networks aren't currently available, though carriers keep promising they'll implement these systems at the end of this year. When these networks are up and running, they'll make the receiving of E-mail via your personal phone a snap. At that time, the phone will be the modem. Until then, users have three options: receiving E-mail to an alphanumeric pager, using cellular modems, or using wireless RF modems.

The drawback to receiving E-mail via wireless pager is obvious: The view screen on most pagers is so small that you're able to read only one or two lines of text at a time. And there's no way to broadcast messages back or reply to mail.

Cellular modems work, but cell-uplink time is, as anyone who has used it knows, inhibitive expensive, both financially and in terms of power usage. The fact that cellular waves are analog can also result in dropped carriers, fade-out, and a number of other signal-to-strength ratio problems. What does this mean to the user? Simple: corrupt or incomplete transmissions, lost mail, and in certain worst-case scenarios, no connection.

This leaves us with the wireless RF modem—specifically, the AllPoints modem from U.S. Robotics, which lists for about \$300 off the shelf. In tests conducted at the Cobb Mobile Communications Lab, the AllPoints modem scored high in just about every torture test we could invent for it. It performed well under all conditions and had the ability to send long messages (up to 56 KB) with little or no problem, both in offices with windows and deep-within corporate structures.

The AllPoints modem succeeded in sending mail while traveling along the expressway at more than 50 miles an hour. The only test we didn't try was the crucial underwater broadcasting test, mainly because we can't afford to throw away \$300.

E-mail anywhere

Perhaps the most novel feature of the Wyndmail service is the ability to send an E-mail message to anyone with a phone. This feature makes it possible to reach anyone with your E-mail, whether or not they have a computer. You can send any message you compose on your PDA or laptop to a phone number. The receiving party gets a pleasant automated message from a Wynd operator asking the person to stay on the line and press 1 to receive the message. In cases where the receiver has a rotary dial, Wyndmail automatically plays the message after a 10-second pause. Your E-mail is read to the recipient by a computer-generated voice. In short, this makes it possible to send long messages on the fly to anywhere in the world with a phone number. To avoid misunderstandings, use words that the computer system and Wynd will likely recognize.

Wynd also provides an 800 number that you can call to dictate a message to an operator. The operator will then forward your message via E-mail to your Wynd address. This makes it possible for people without computers to send you E-mail.

Limits

We found it possible to send long messages to laptops, but in the case of PDAs (such as the Newton), it became necessary to limit incoming messages to about 12 KB. In the cases where we sent long messages, the Newton would sometimes crash when the software tried to decompress the radio packets. In most cases, simply resetting the Newton via the Reset button on the back seemed to fix this problem. In other cases, we actually called Wynd Tech Support and had them "flush" our accounts to remove the long messages from the queue.

Forwarding messages

We use Eudora Pro on our desktop machines to check our numerous E-mail accounts and then forward them to our Wynd accounts, thus getting all of our E-mail routed to

handheld wireless devices. Eudora works perfectly in this scenario, and its filtering features make receiving and forwarding E-mail a snap. Fortunately, you can set both the Wynd account software and Eudora Pro to leave messages on the server, so that even if you don't receive a message via your PDA, you can read it from your desktop machine with whatever mail client program you use.

Conclusion

The AllPoints modem, used in conjunction with the Wyndmail service and a Newton Messagepad 2000, proved to be the best solution for E-mail on the go. When compared to

cellular modems (where a charge is levied by your cellular service provider for every minute of connect time), Wyndmail, at a flat \$40 per month, is much cheaper, especially when you consider its long list of features in addition to regular E-mail. Next month, we'll take a more in-depth look at CDMA technology and the ability to receive E-mail with a digital cellular phone. And don't forget to check out the hardware and software mentioned in this article at

<http://www.wynd.com>

<http://www.usr.com>

<http://www.newton-inc.com>

<http://www.qualcomm.com> *

Letters to the editor

E-mail viruses

Q The June issue of *Inside the Internet* has an error in the article "Avoiding Computer Viruses," with regard to the release of a computer virus. Your article states that you "...can't infect your computer by browsing the Internet, logging on to an online service, downloading a program, or opening an E-mail message." You certainly can receive a virus through E-mail, and we've known this fact for some time now. What a glaring mistake, and on the front page. And what about picking up viruses through Java applets and ActiveX controls?

Bridget Hull
Winter Haven, Florida

A We understand your concern. Perhaps we didn't state our point about viruses and E-mail clearly enough, so we'll try again.

The idea of E-mail viruses scares most Internet users, which is understandable since E-mail is such a vital and widely used feature of the Internet. Since the early 1980s, the threat of E-mail viruses has plagued the Internet in two possible forms. The first virus type is fiction—an E-mail virus that infects your computer when you simply open and read an E-mail note. The second virus type is a real threat—a virus program included in an

E-mail attachment. Let's consider the fictional E-mail virus first.

An E-mail virus, by definition, has the ability to infect a computer when an E-mail message is read. There have been numerous hoaxes concerning E-mail viruses (such as the notorious Good Times virus hoax), which have magnified the myth of the E-mail virus. These hoaxes are usually posted as warnings on newsgroups from bogus E-mail addresses and include the following pattern of information:

- Claims that a federal agency, such as the FCC or Defense Department, has released a warning about a virus that is quickly spreading over the Internet
- Entreats the reader to forward the warning message as widely as possible to protect others
- Maintains that the virus can be launched from any PC-based mail reader software
- Suggests that the virus is small, fast, and all but undetectable—in truth, a virus, once identified, is very easy to detect
- Doesn't reference authoritative sources of information, such as antivirus software companies or emergency response teams

There has been a lot of speculation in the alt.comp.virus newsgroup about how an E-mail

message could contain a virus (especially with the advent of HTML E-mail). Most theories deal with the idea of an E-mail message being rigged to automatically launch an attached file when an E-mail message is opened. But no one has ever outlined a viable, concrete method for creating such a mechanism or virus in an E-mail message. Here are some reasons why such a virus is not yet possible.

Virus limitations

Computer viruses are programs (executable code), and you must execute (run, launch, or start up) them in order for the viruses to spread or perform any function. An unexecuted virus can't do any harm. Most E-mail readers can read ASCII text only and aren't capable of including instructions to execute a program. HTML E-mail messages are also plain text files, which can't include executable code. The data stream files that are included in HTML E-mail messages (like JPG or GIF files) are simple data files and can't include virus code. You can't get a virus simply by opening or reading an E-mail message (or newsgroup message) because these readers are incapable of executing a virus program in order for it to run and do damage. You can, however, get a virus from an E-mail attachment.

File attachments

Most E-mail programs now provide features that let you attach a file to an E-mail message for transmission over the Internet. You can attach almost any type of file to an E-mail message, including executable programs. But when you attach a program file to a message, your E-mail program encodes it into a special form so the binary (8-bit) program file isn't corrupted by transferring it into text-only (7-bit) E-mail transport medium. This is yet another reason why you can't get a virus simply by opening an E-mail message—attached program files are encoded and must be detached before they can be executed.

You can even download a virus-infected attachment to your desktop, and you're safe as long as you don't execute the file. In fact, if you don't have antivirus software that automatically checks E-mail attachments, you should detach the file (Save As) to your desktop and then use an antivirus program to check the file before you open it. This holds true with all attachments, even Word and

Excel files, which can be templates capable of transmitting a macro virus.

Java

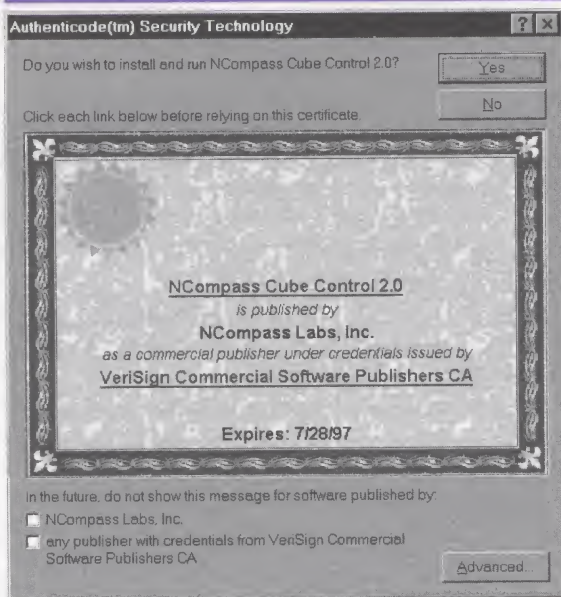
In late 1996 and again in February 1997, two publications—*Unigram* and *RISK newsletter*—mentioned a Java virus called BlackWidow, but this report was simply a rumor. There are no known Java viruses "in the wild" (running loose on the Internet). Several antivirus companies are experimenting by trying to create Java viruses, so they'll be ready if such a virus ever exists. You should also keep in mind that Java programming code was designed with security in mind. Java's security features make it very difficult, if not impossible, to attach a virus to a Java applet. A properly implemented Java interpreter can't access your hard drive directly no matter where it's running. There are Java bugs that let you list the contents of a user's C drive or continuously launch additional browser windows, but since Java can't command the C drive to read or write to local files, these bugs aren't viruses and can't permanently damage your computer. In addition, there are no Java-enabled mailers at this time.

ActiveX

ActiveX is a simplified version of Microsoft's OLE (Object Linking and Embedding) technology that downloads and executes small amounts of native machine code on your computer. ActiveX controls can run faster because they use applications on your computer or operating system, but they can potentially contain virus-malicious code intended to harm your computer. To help protect Internet users from viruses, Microsoft built into ActiveX the Authenticode Security feature, which allows developers to identify their controls with unique digital signatures and makes it easy to trace the ActiveX control's origins.

When you open an HTML document containing a new ActiveX control, it will open the Authenticode Security Technology dialog box and display a digital signature certificate, like the one shown in **Figure A** on page 14. The Authenticode Security Technology dialog box gives the user the option to accept or cancel the download of the ActiveX control. If the dialog box doesn't include a digital signature, you're taking a risk if you accept the ActiveX

Figure A



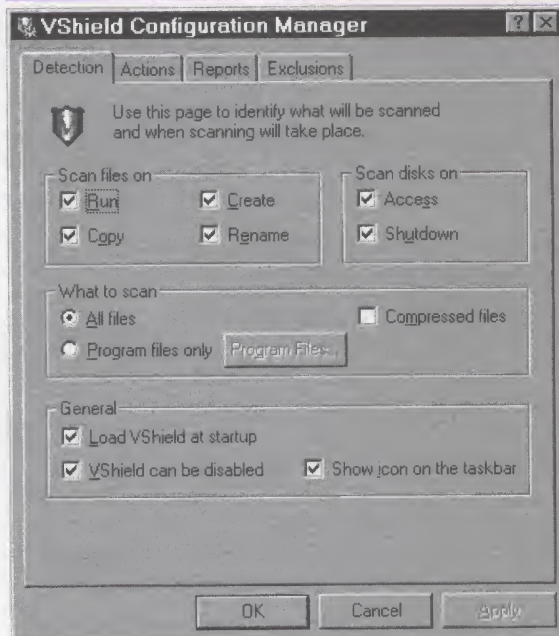
Authenticode Security Technology identifies each ActiveX control's developer.

control. There are known ActiveX control viruses "in the wild," but you can't directly include an ActiveX control as part of an E-mail message—you can include a control that will appear as a file attachment, but again, you'd have to execute the file. Antivirus companies are creating experimental ActiveX control viruses so they can deal with this virus threat.

Protecting yourself

The major antivirus software developers, like Symantec (Norton AntiVirus utility software)

Figure B



McAfee's VirusScan antivirus software lets you control what files you want to scan and when to scan them.

and McAfee, have already included features in their software packages that can help you protect yourself against infected E-mail attachments, as well as potential Java and ActiveX viruses. For example, McAfee's VirusScan lets you configure the antivirus software package to determine which files it automatically scans (all files, program files, or compressed files) and when. **Figure B** shows VirusScan's VShield Configuration Manager dialog box. We'll tell you more about McAfee VirusScan in next month's issue of *Inside the Internet*. *

Power searching

Each month, we include a search tip in *Inside the Internet*, but if you find yourself wanting more information about searching the Internet, take a look at The Cobb Group's newest journal, *Power Searching with AltaVista*. This journal, available in both paper and electronic editions, includes articles that can help you be more productive in your Internet searches, such as "Finding Jobs and Being Found for Jobs," "AltaVista Search's Personal eXtensions," and "Webmaster Tips." You can take a look at the electronic version of *Power Searching with AltaVista* at <http://www.cobb.com/alt>.

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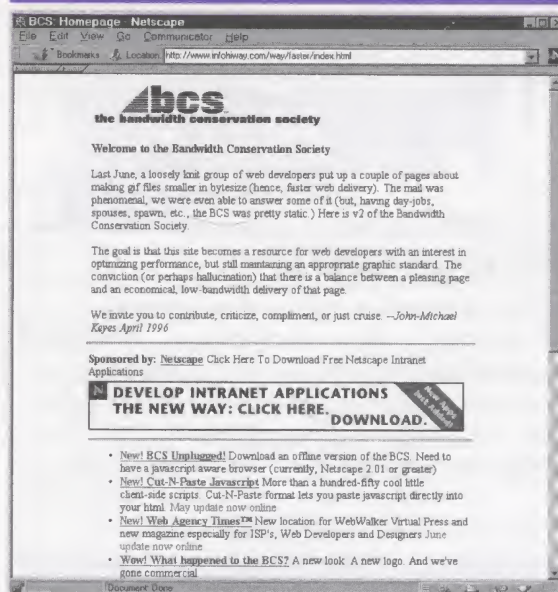
Site of the month: The Bandwidth Conservation Society

In 1982, the U.S. Department of Defense's Advanced Research Projects Agency enacted the Transmission Control Protocol (TCP) and Internet Protocol (IP) and declared TCP/IP as the standard for Internet transmissions. In that year, there were 235 Internet hosts, and William Gibson coined the term *cyberspace* in his science fiction novel *Neuromancer*. Today, the Internet has more than 17 million hosts and as many as 60 million users. The mass of data transmissions over the Internet is so staggering that current technology has trouble keeping up with traffic. Bandwidth is at a premium. Our *Inside the Internet* site of the month for October is The Bandwidth Conservation Society, a prime example of the Internet at its best.

The Bandwidth Conservation Society is dedicated to providing Web developers with options for optimizing Web page performance. The society provides tips and techniques for creating high-quality graphics while lowering bandwidth and increasing Web page load times. At The Bandwidth Conservation Society, shown in **Figure A**, you'll find tips on how to reduce the size of GIF files, tutorials, JPG files, background images, logotype, CRLI (Consecutive Run Length Insertion), and interactive forms. There's also a great cut-and-paste JavaScript archive, a developer's forum where you can trade ideas or

ask questions about bandwidth conservation techniques. The Bandwidth Conservation Society is located at <http://www.infohighway.com/way/faster/index.html> *

Figure A



At The Bandwidth Conservation Society, you'll find tips and techniques on creating Web pages while maintaining lower bandwidth.

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Roadside café

Each month, we'll let you know about Web sites that have attractive interfaces, are valuable resources, or are just good examples of effective Web sites. If you know of or work

for a Web site that you think would be of interest to our readers, please let us know about it. You can contact the editor at int_editor@cobb.com.



The Practical Mac

This Web site provides some great resources for Macintosh owners. You'll find troubleshooting tips and advice on creating your own Web site, setting up a Macintosh network, tracking down extension conflicts, and more. The Practical Mac is located at

<http://www.practicalmac.com/>

TeleWorth
Improving your bottom line. Online.

Rate your calls with TeleRate [here](#).

TeleWorth

The TeleWorth Web site can save you money with a service called TeleRate, which helps you determine the best calling plan for your needs. You'll also find information about how to avoid telemarketers and links to other consumer-oriented Internet resource sites. You'll find TeleWorth at

<http://www.teleworth.com/>

CONGRESS.ORG

If you want to find out how to contact your congressional representative or senator, you'll want to visit CONGRESS.ORG. This site includes a congressional directory with information on House and Senate committee members, congressional leaders, and daily schedules for both the House and Senate. Just point your browser to

<http://www.congress.org>

**NIGHT
OF THE
LIVING
YAHOO!**

Night of the Living Yahoo!

If you're looking for something to do on Halloween, try Yahoo!'s Night of the Living Yahoo! Web page. This page links to lots of fun Halloween sites, including Monster pages, party and costumes tips, ghost stories, murder mystery party games, jack-o'-lantern pages, and paranormal phenomena. You'll find a link to the Night of the Living Yahoo! page and lots of other Halloween Web sites at

http://www.yahoo.com/Society_and_Culture/Holidays/Halloween/

What's the meaning of this?

What do the following phrases mean: "Between a rock and a hard place," "Jumping the gun," and "In the lime light"? Do you know the difference between an "old coot" and "a son of a gun"? Keep a stiff upper lip—you can find the definitions to these phrases and many more at the What's The Meaning Of This page. You can also submit a phrase for definition. Just gather your kit and caboodle, shake a leg, and point your browser to

<http://www.rootsweb.com/~genepool/meanings.htm>

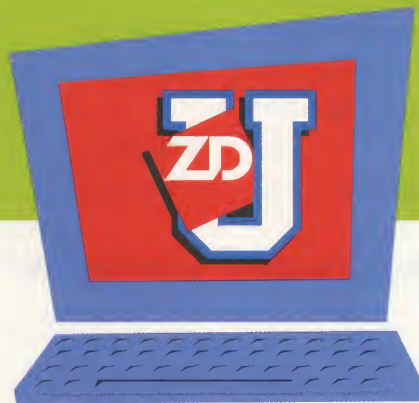
Coming next month...

In next month's issue of *Inside the Internet*, we'll explain how you can make your Java programming safer, take a look at cross-platform color matching, and examine Web Rings, which are shaping Web site access.

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